

ABSTRACT OF THE DISCLOSURE

According to the present invention, an ultrathin buried diffusion barrier layer (UBDBL) is formed over all or part of the doped polysilicon layer of a polycilicide structure composed of the polycrystalline silicon film and an overlying film of a metal, metal silicide, or metal nitride.

5 More specifically, according to one embodiment of the present invention, a memory cell is provided comprising a semiconductor substrate, a P well, an N well, an N type active region, a P type active region, an isolation region, a polycilicide gate electrode structure, and a diffusion barrier layer. The P well is formed in the semiconductor substrate. The N well is formed in the semiconductor substrate adjacent to the P well. The N type active region is defined in the P well and the P type active region is defined in the N well. The isolation region is arranged to isolate the N type active region from the P type active region. The polycilicide gate electrode structure is composed of a polycrystalline silicon film and an overlying metal, metal silicide, or metal nitride film. The polycrystalline silicon film comprises an N⁺ polysilicon layer formed with the N type active region and a P⁺ polysilicon layer formed with the P type active region. The diffusion barrier layer is formed in the polycilicide gate electrode structure over a substantial portion of the polycrystalline silicon film between the polycrystalline silicon film and the metal, metal silicide, or metal nitride film.